pressure cylinder is adapted to exhaust, said low-pressure cylinder being of such a capacity that the pressure of the gases within said cylinders during exhaust falls below that of the atmosphere, pistons in said cylinders, a valve connected with the high-pressure cylinder through which air may be admitted to said cylinder when the pressure thus falls to scavenge and cool the cylinder, a grooved cam, connections between the groove of said cam and the said valve for controlling the latter, the groove in the cam being adapted to hold the valve closed except during the exhaust from the high-pressure cylinder, and a relief valve in the piston of the low-pressure cylinder that is adapted to open by air pressure to prevent excessive back pressure on said low-pressure cylinder.

12. In a compound explosive engine, a plurality of high-pressure cylinders, a low-pressure cylinder connected with each of said high-pressure cylinders into which the high-pressure cylinders are adapted to exhaust, said low-pressure cylinder being of so much greater capacity than either of the high-pressure cylinders that the pressure of the gases within the exhausting cylinder and the low-pressure cylinder falls below that of the atmosphere, pistons in all of said cylinders, valves connected with the high-pressure cylinders during the exhaust to scavenge and cool the exhausting cylinder, and a relief valve in the piston of the low-pressure cylinder that is adapted to open by air pressure to prevent excessive back pressure on the piston.

13. In a combined explosive engine, a high pressure cylinder connected thereto, a crank shaft, a valve for admitting air to said high pressure cylinder during the exhaust from the high pressure cylinder into the low pressure cylinder, and means controlled by the crank shaft for preventing said valve from opening except during the exhaust from the high pressure cylinder.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH A. WILLIAMS.

Witnesses:

S. E. FOUTS,

B. W. BROCKETT.